

CLAIMS

We Claim:

1. A method for detecting motion from a digital video stream comprising the steps of:

inputting the digital video stream into an MPEG (Moving Picture

5 Expert Group) encoder;

abstracting the relevant video motion detection data from said digital
video stream;

10 estimating the amount of motion for each of the 16x16-pixel macro-block, from said abstracted video motion detection data, of a current image frame relative to the corresponding 16x16-pixel macro-block of an image reference frame; and

determining, from the estimated amount of motion, whether the current frame is a motion frame.

2. The method according to claim 1, wherein said step of estimating comprises the
15 steps of:

calculating the Sum of Absolute Differences (SAD) for each 16x16-pixel macro-block of the current image frame relative to image reference frame; and

placing the SAD values of every macro-block in a designated table.

20 3. The method according to claim 2, wherein said SAD is defined as:

$$\text{SAD16}(x_c, y_c, x_r, y_r) = \sum_{i,j=0..16} |C_{x_c+i, y_c+j} - R_{x_r+i, y_r+j}|;$$

where C is the current image and R is the reference image.

4. The method according to claim 2, further comprising the step of:

applying a weighting function to each cell of said table.

5. The method according to claim 4, wherein said weighting function is defined as:

$$W(i,j) = \text{MAX}(0, ST(i,j) - Ktr + \text{NUM_NBR}(i,j) * Kn);$$

where $ST(i,j)$ is the SAD table cell value, NUM_NBR is the number of
it's non-zero members, Kn is a constant added per non-zero neighbor, and
5 Ktr is a constant decremented from the cell.

6. The method according to claim 4, wherein said step of determining comprises the
steps of:

summing the cells of the SAD table; and

if the accumulated number of motion clocks is larger than a pre-

10 determined threshold value designating said current image frame as a motion
frame.

7. The method according to claim 1, further comprising the step of:

calculating the Motion Vector (MV) for each of the 16x16-pixel macro-
blocks of said image.

- 15 8. The method according to claim 1, further comprising the step of:

transferring the data associated with each of the motion frames together
with the encoded video stream to a control center for further analysis.

9. Apparatus for detecting motion from a digital video stream comprising:

20 a motion estimator for receiving a digital video stream and abstracting
the relevant data for video motion detection, said motion estimator
comprising a calculator for calculating the Sum of Absolute Differences
(SAD) for each 16x16-pixel macro-block of the current image frame relative
to corresponding 16x16-pixel macro-block of an image reference frame from
said abstracted video motion detection data.

10. The apparatus according to claim 9, further comprising:
 - a tabular unit for compiling the calculate SAD values in tabular form;
 - a weighting unit for applying a weighting function to each cell of said tabular unit;
 - 5 a summing unit for summing the weighted cells of the SAD table; and
 - a motion detector for determining whether the current image frame is to be designated as a motion frame.
11. The apparatus according to claim 10, wherein said motion detector comprises an accumulator for summing the number of motion clocks.